

### **AMENDMENTS TO THE CLAIMS**

Please amend the claims as set forth hereinbelow.

1-9. **(cancelled)**

10. **(currently amended)** ~~The apparatus of Claim 8, wherein~~

An optical apparatus, comprising:

a bottom surface and walls formed on a first substrate and substantially defining a detection volume and an upper opening thereof;

an optical waveguide having an end face, the optical waveguide aligned substantially parallel to the first substrate and positioned so that at least a portion of light emerging from the end face enters the detection volume; and  
a photodetector having an active area on a detector substrate, the detector substrate mounted on the first substrate so as to cover at least a portion of the upper opening of the detection volume with at least a portion of the active area exposed to the detection volume,

wherein:

the optical waveguide is formed on a waveguide substrate;

the optical waveguide is mounted on the first substrate; and

light emerging from the end face of the optical waveguide may enter the detection volume through a substantially transparent segment of one of the walls thereof.

11-19. **(cancelled)**

20. **(currently amended)** ~~The apparatus of Claim 19, wherein~~

An optical apparatus, comprising:

a bottom surface and walls formed on a first substrate and substantially defining a detection volume and an upper opening thereof;

an optical waveguide having an end face, the optical waveguide aligned substantially parallel to the first substrate and positioned so that at least a portion of light emerging from the end face enters the detection volume;

a photodetector having an active area on a detector substrate, the detector substrate mounted on the first substrate so as to cover at least a portion of the

upper opening of the detection volume with at least a portion of the active area exposed to the detection volume; and  
a reflective coating on at least a portion of the bottom surface of the detection volume,  
wherein the reflective coating comprises a metallic coating, and the metallic reflective coating serves as an electrical contact for the active area of the detector substrate.

21-33. **(cancelled)**

34. **(currently amended)** ~~The method of Claim 32, further comprising~~  
A method, comprising:  
forming a bottom surface and walls on a first substrate, thereby substantially defining a detection volume and an upper opening thereof;  
forming an optical waveguide on a waveguide substrate;  
mounting the optical waveguide on the first substrate;  
positioning the optical waveguide substantially parallel to the first substrate so that at least a portion of light emerging from an end face of the optical waveguide enters the detection volume;  
mounting a detector substrate on the first substrate so as to cover at least a portion of the upper opening of the detection volume with at least a portion of an active area on the detector substrate exposed to the detection volume; and  
forming a substantially transparent segment of one of the walls of the detection volume for admitting into the detection volume at least a portion of the light emerging from the end face of the optical waveguide.

35-43. **(cancelled)**

44. **(currently amended)** ~~The method of Claim 43, wherein-~~  
A method, comprising:  
forming a bottom surface and walls on a first substrate, thereby substantially defining a detection volume and an upper opening thereof;  
forming a reflective coating on at least a portion of the bottom surface of the detection volume;

positioning an optical waveguide substantially parallel to the first substrate so that at least a portion of light emerging from an end face of the optical waveguide enters the detection volume; and  
mounting a detector substrate on the first substrate so as to cover at least a portion of the upper opening of the detection volume with at least a portion of an active area on the detector substrate exposed to the detection volume,  
wherein the reflective coating comprises a metallic coating, and the metallic reflective coating serves as an electrical contact for the active area of the detector substrate.

45-47. **(cancelled)**

48. **(original)** An optical apparatus, comprising:  
a bottom surface and walls formed on a first substrate and substantially defining a detection volume and an upper opening thereof;  
a semiconductor laser having a first laser end face and a second laser end face, the semiconductor laser aligned substantially parallel to the first substrate and positioned so that at least a portion of light emerging from the first laser end face enters the detection volume; and  
a photodetector having an active area on a detector substrate, the detector substrate mounted on the first substrate so as to cover at least a portion of the upper opening of the detection volume with at least a portion of the active area exposed to the detection volume.
49. **(original)** The apparatus of Claim 48, further comprising an optical waveguide positioned so that at least a portion of light emerging from the second laser end face enters the optical waveguide.
50. **(original)** The apparatus of Claim 49, wherein the optical waveguide comprises a planar optical waveguide formed on the first substrate.
51. **(original)** The apparatus of Claim 49, wherein the optical waveguide is mounted on the first substrate.

52. **(original)** The apparatus of Claim 49, wherein at least a portion of the light emerging from the second laser end face enters the optical waveguide through an end face thereof.
53. **(original)** The apparatus of Claim 49, wherein at least a portion of the light emerging from the second laser end face enters the optical waveguide by transverse-coupling thereto.
54. **(original)** The apparatus of Claim 48, wherein the semiconductor laser is formed on the first substrate.
55. **(original)** The apparatus of Claim 48, wherein the semiconductor laser is formed on a laser substrate and mounted on the first substrate.